



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 17 JUN 2004

WIPO PCT

Applicant's or agent's file reference TIMK 8394WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/US 03/16850	International filing date (day/month/year) 29.05.2003	Priority date (day/month/year) 29.05.2002
International Patent Classification (IPC) or both national classification and IPC G01L3/10		
Applicant THE TIMKEN COMPANY		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>		
Date of submission of the demand 18.12.2003	Date of completion of this report 15.06.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office - Glitschiner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Authorized Officer Zafiropoulos, N Telephone No. +49 30 25901-630 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US 03/16850

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-9 as originally filed

Claims, Numbers,

1-29 as originally filed

Drawings, Sheets

1/14-14/14 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-29
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-29
Industrial applicability (IA)	Yes: Claims	1-29
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US03/16850

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: PATENT ABSTRACTS OF JAPAN vol. 2000, no. 19, 5 June 2001 (2001-06-05) & JP 2001 033322 A (NTN CORP), 9 February 2001 (2001-02-09)
D2: DE-A-3437379 (1985-04-25)

The document D2 was not cited in the international search report. A copy of the document is appended hereto.

1) The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 20 does not involve an inventive step in the sense of Article 33(3) PCT.

The document **D1** is regarded as being the closest prior art to the subject-matter of claim 1, 20, and discloses (the references in parentheses applying to this document):

- a) A bearing (1) attached to a shaft
- b) Magnetostriction patterns (6,7) formed on the outer peripheral surface of the inner ring(3)
- c) Coils for sensing and detecting the permeability of the magnetostriction material are fixed on the inner peripheral surface of the outer ring.
- d) A detecting circuit (not shown)

The subject-matter of claim 1, 20 therefore differs from this known D1 in that:

- a) Instead of the magnetostriction patterns which are formed on the inner ring, a magnetoelastic ring is press-fit to the inner race.
- b) Separate sensing and detecting coils

The problem to be solved by the present invention may therefore be regarded as simplification of the installation of a torque sensor on a shaft and (additionally added by the examiner) the use of a sensor which is not bulky and difficult to install and remove .

D1 solves the same problem as the current application making the application not

inventive. For the completeness of the argumentation D2 is introduced in the procedure.

From D2 is known a sensor with a magnetoelastic ring (2) **press-fit** on a shaft (see claim 10) and at least one sensor unit using one coil as sensing and detecting element. The magnetoelastic ring of D2 provides the same advantages as the patterns of D1, therefore for the skilled person would be a normal option to use a ring instead of a pattern, especially when the design of the bearing in D1 allows this without any modification.

The use of a simple or separate coils for excitation and sensing are both known in the art and both provide the same advantages, the use of one coil would even simplify the sensor. Furthermore the use of a hall effect sensor as sensing element together with a coil for excitation is state of the art.

2) The above mentioned remarks apply also for bearings with tapered races. The incorporation of sensing and excitation coil in a single package is also known. The claims 2-4 and 21-23 are not inventive (Art. 33(3) PCT).

3) The claims 5-7 and 24-26 disclose possibilities the skilled person would use in order to mount the sensor of D2 on the bearing of D1. These claims can not be seen as involving an inventive step (Art. 33(3) PCT).

4) The claims 8-19 and 27-29 disclose embodiments or measuring techniques which are known in the art. The plurality of them is also disclosed in D2. These claims do not provide any additional inventive step to the application (Art.33(3) PCT).